

Statins

Information Sheet K

This information sheet provides an overview of up to date research on MND and the use of statins. Specifically, it looks at statins in respect to developing MND and MND progression after diagnosis.

The content is split into the following sections:

- 1: **What are statins?**
- 2: **Statins and risk of developing MND**
- 3: **Statins and rate of MND progression**
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Disclaimer: Please note that information provided in this information sheet is based on a review of the currently available literature. This information sheet was written by MND Association staff who are not clinicians and so any information provided in this sheet should not be considered clinical advice. You should always discuss potential treatments with your clinician.



This symbol is used to highlight **our other publications**. To find out how to access these, see *Further information* at the end of this sheet.

1: What are statins?

Statins are a class of prescription drugs that are used to lower cholesterol levels in people with, or at risk of, cardiovascular disease. They work by decreasing the amount of 'bad cholesterol', known as 'low density lipoprotein', in the blood. This lowers the risk of cardiovascular disease. The reported adverse side effects of statins, including muscle cramps, pain and weakness, can overlap with some of the symptoms of MND.

Researchers have been examining the association between statins and MND with focus on two questions:

- 1) Does taking statins increase the risk of developing MND?
- 2) Will taking statins after diagnosis influence the rate of MND progression?

Any possible increased risk of MND from the use of statins is probably small, and outweighed by the important clinical advantages of statin medications to prevent and treat cardiovascular disease.

The available evidence from studies is contradictory and more research is still needed. Some studies have suggested that statins can increase the risk of developing MND, but others have shown no association. Some reports have also shown an increased rate of disease progression if taking statins after diagnosis, but other studies have shown no effect on progression.

If you have any concerns about taking statins you should talk to your GP or neurologist.

Because the up-to-date evidence is contradictory, we have provided a systematic summary of the key studies of statins and MND to inform you of the conclusions of each.

2: Statins and risk of developing MND

At the time of writing this information sheet, five studies have examined the available data investigating the risk of developing MND after taking statins. Four of these have concluded that the use of statins is not a risk factor for developing MND. In contrast, the most recent study looking at statin-related side effects known as 'adverse events', conducted by the US Food and Drugs Administration (FDA), suggests several statins to be each associated with an increased risk of developing MND.

Golomb's recent paper (2018) looked at the data available from reports of adverse effects resulting from statin use, focusing on the different types of statins. This data, provided by the FDA, list adverse effects and development of MND in people who had taken statins. To put this in perspective, looking at the **four highest reported associations in the study**, there were 78 cases of MND reported in 83 million prescriptions of Simvastatin, 20 cases of MND in 3 million prescriptions of Lovastatin, 2

cases in 433,000 prescriptions of Pitavastatin, and 128 cases in 20 million prescriptions of Atorvastatin, so any possible increased risks appear small in real terms.

Colman (2008) performed retrospective analysis of 41 statin clinical trials and did not reveal an increased rate of MND when comparing participants who took statins and a placebo group (who would have been given a 'dummy' drug). This study examined statin/placebo use from the large number of clinical trials. From this large group, nine people were reported to have MND when using statins compared to ten people who had MND who were taking placebos. This led the group to a conclusion that taking statins does not increase the chances of somebody developing the disease.

A study by Sorensen (2010) using the Danish national registry, identified that there was no association between the use of statins and the development of MND. The lack of association was not dependent on the gender, nor the amount of time the person had been taking statins; there was no association with statin use and risk of MND when looking at statin users, former users, and users of short and long duration.

More recently, Zheng (2013) conducted a systematic review, which concluded that MND is unlikely to be associated with statin use. In addition, Finegold et al (2014) looked at 14 primary prevention trials (over 46,000 patients) and also found no association between MND and statins.

3: Statins and rate of MND progression

Research has been contradictory as to whether statins influence the progression of MND. Results from studies that aimed to answer whether the use of statins influences the rate of progression in people with MND are outlined below. A couple of studies have shown that taking statins may increase the rate of MND progression. In contrast, other studies have shown that taking statins has no effect on MND progression.

Zinman (2008) followed 164 people with MND over the period of one year. Twenty percent of these were taking statins and the remaining 80% were not. Over a year, the individual's rate of progression (measured ALSFRS score) was recorded along with the severity and frequency of muscle cramping. The results from this study suggest that people taking statins experienced an increased rate of disease progression and an increase in muscle cramp frequency and severity compared to those who were not taking these drugs.

In 2011, Nefussy extracted data from measurements taken during clinical trials of two other drugs which were not statins. In one trial there was no effect on functional decline between people taking statins and those who didn't. In the other trial there was an effect on the rate of functional decline. Interestingly, when the people in either trial were separated by gender, the rate of decline in both trials was greater in women than in men. The authors concluded that statins more negatively affect MND progression in females than in males.

A study by Drury (2008) reviewed details of 459 people with MND over a ten year period. Approximately 15% were taking statins compared to 85% who were not. This study suggested that there was not a significant difference between people with MND who take statins and those who don't. In another study (Zeng, 2012), the research group reviewed the available scientific literature to see if there was a link between statin use and MND. The papers concluded that there was no definite association between statin use and MND progression.

Even though these studies contradict each other, the possibility that statins may influence the progression of MND remains of interest. The answer to this question will not be known until more rigorous research is conducted in this area, however, we suggest that any decision about taking (or giving up) statins is discussed with a GP or neurologist.

MND and cholesterol

Based on previous studies (Chio, 2009, Dupuis, 2008), people with MND with higher cholesterol levels were observed to have slower disease progression and increased survival. This should perhaps be taken into consideration since statins are designed to reduce cholesterol levels, but yet again, more evidence is required.

4: References

Beltowski et al 2010. Statins and ALS: the possible role of impaired LXR signaling. *Med Sci Monit.*

Chiò et al. 2009 Lower serum lipid levels are related to respiratory impairment in patients with ALS. *Neurology.*

Colman E, et al 2008. An evaluation of a data mining signal for amyotrophic lateral sclerosis and statins detected in FDA's spontaneous adverse event reporting system. *Pharmacoepidemiol Drug Saf.*

Drory et al 2008. Influence of statins treatment on survival in patients with amyotrophic lateral sclerosis. *J Neurol Sci.*

Dupuis et al 2011. Energy metabolism in amyotrophic lateral sclerosis. *Lancet Neurol.*

Edwards et al 2007. Statins, neuromuscular degenerative disease and an amyotrophic lateral sclerosis-like syndrome: an analysis of individual case safety reports from vigibase. *Drug Saf.*

Finegold et al 2014. What proportion of symptomatic side effects in patients taking statins are genuinely caused by the drug? Systematic review of randomized placebo-controlled trials to aid individual patient choice. *Eur J Prev Cardiol.*

Golomb BA et al 2009. Amyotrophic lateral sclerosis-like conditions in possible association with cholesterol-lowering drugs: an analysis of patient reports to the University of California, San Diego (UCSD) Statin Effects Study. Drug Saf.

Golomb et al 2018. Amyotrophic Lateral Sclerosis Associated with Statin Use: A Disproportionality Analysis of the FDA's Adverse Event Reporting System. Drug Saf.

Nefussy B et al 2010. Gender-based effect of statins on functional decline in amyotrophic lateral sclerosis. J Neurol Sci.

Sørensen and Lash 2009. Statins and amyotrophic lateral sclerosis--the level of evidence for an association. J Intern Med.

Zheng Z et al 2013. Statins and amyotrophic lateral sclerosis: a systematic review and meta-analysis. Amyotroph Lateral Scler Frontotemporal Degener.

Zinman L, et al 2008. Are statin medications safe in patients with ALS? Amyotroph Lateral Scler.

5: How do I find out more?

Further information

You may find these guides from the MND Association helpful:

Living with motor neurone disease – our main guide to help you manage the impact of the disease

Caring and MND: support for you – comprehensive information for unpaid or family carers, who support someone living with MND

Caring and MND: quick guide – the summary version of our information for carers

You can download most of our publications from our website at www.mndassociation.org/publications or order in print from the MND Connect helpline, who can provide further information and support.

MND Connect can also help locate external services and providers, and introduce you to our available services, including your local branch, group, Association visitor or regional care development adviser.



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We welcome your views

Your feedback is really important to us, as it helps improve our information for the benefit of people living with MND and those who care for them. If you would like to provide feedback on any of our information sheets, you can access an online form at: www.surveymonkey.co.uk/r/infosheets_research

You can request a paper version of the form or provide direct feedback by email: research@mndassociation.org.